USER MANUAL

Longo programmable controller
LPC-2.NE1 module

Version 4

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User Manual

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STANDARDS AND PROVISIONS: Standards, recommendations, regulations and provisions of the country in which the devices will operate, must be considered while planning and setting up electrical devices. Work on 230 VAC network is allowed for authorized personnel only.
DANGER WARNINGS: Devices or modules must be protected from moisture, dirt and damage during transport, storing and operation.
WARRANTY CONDITIONS: For all modules LONGO LPC-2 – if no modifications are performed upon and are correctly connected by authorized personnel – in consideration of maximum allowed connecting power, we offer warranty for 24 months from date of sale to end buyer. In case of claims within warranty time, which are based on material malfunctions the producer offers free replacement. The method of return of malfunctioned module, together with description, can be arranged with our authorized representative. Warranty does not include damage due to transport or because of unconsidered corresponding regulations of the country, where the module is installed.

This device must be connected properly by the provided connection scheme in this manual. Misconnections may result in device damage, fire or personal injury.
Hazardous voltage in the device can cause electric shock and may result in personal injury or death.
NEVER SERVICE THIS PRODUCT YOURSELF!
This device must not be installed in the systems critical for life (e.g. medical devices, aircrafts, etc.).
If the device is used in a manner not specified by the manufacturer, the degree of protection provided by the equipment may be impaired.

Waste electrical and electronic equipment (WEEE) must be collected separately!

LONGO LPC-2 complies to the following standards:
•EMC: IEC 61131-2
•LVD: IEC 61131-2
•Vibrations and climatic-mechanical: EN 60068-2-6, EN 60068-2-27, EN 60068-2-29

Smarteh d.o.o. operates a policy of continuous development. Therefore we reserve the right to make changes and improvements to any of the products described in this manual without any prior notice.

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1 DESCRIPTION

LPC-2.NE1 Ethernet module is intended to connect LPC-2 standalone system with LAN .

It acts as Modbus slave device, using TCP/IP protocol. IP and MAC addresses are configurable from main controller module application.

NOTE: For proper system configuration and data allocation please refer to *LPC Composer* software
help menu.

2 FEATURES

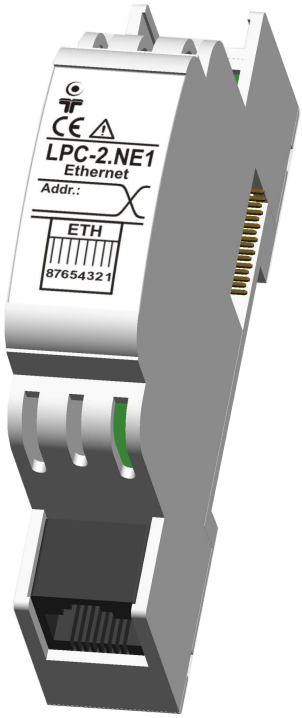


Figure 1: LPC-2.NE1 communication module

Table 1: Technical data
Compliant to Ethernet II and IEEE802.3 10Base5, 10Base2, 10BaseT, 10Mbps
IP and MAC address management
Modbus slave device mode, TCP/IP protocol
Modbus commands support
3 diagnose LEDs
Standard DIN EN50022-35 rail mounting

3 INSTALLATION

3.1 Connection scheme example

Figure 2: Connection scheme example

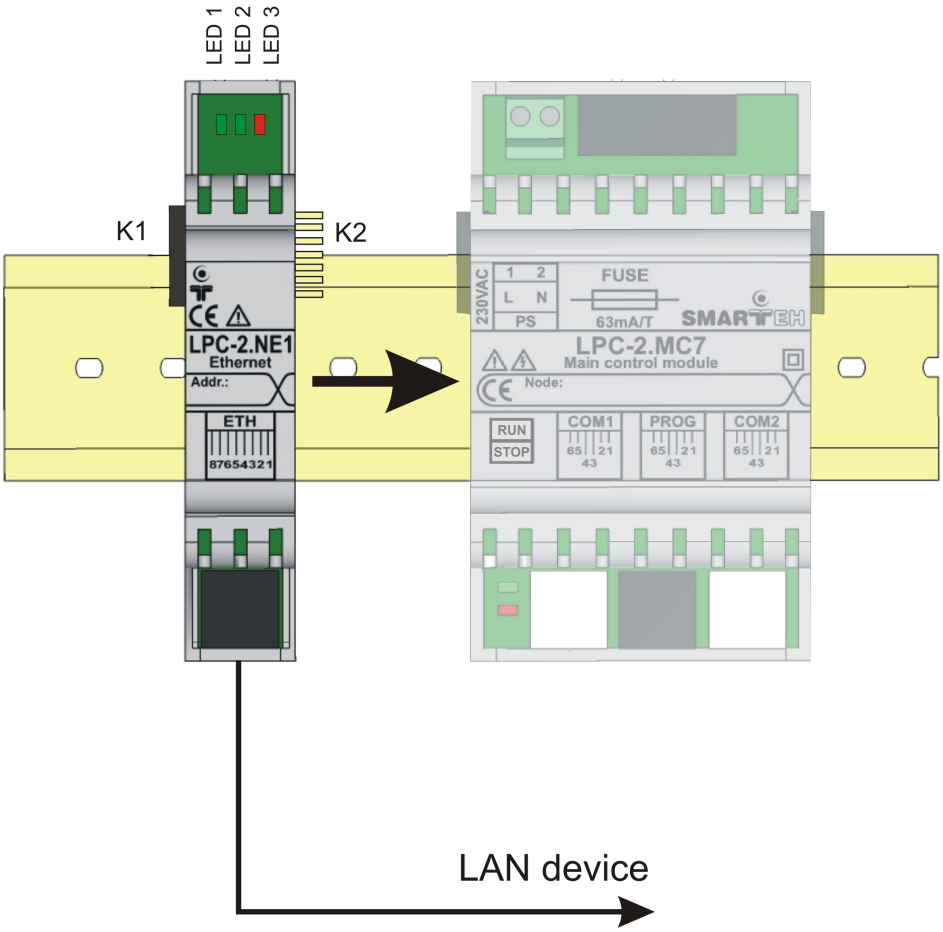


Table 1: K3 communication port		
ETH.1	Tx data +	transmit wire pair
ETH.2	Tx data -	
ETH.3	Rx data +	receive wire pair
ETH.6	Rx data -	

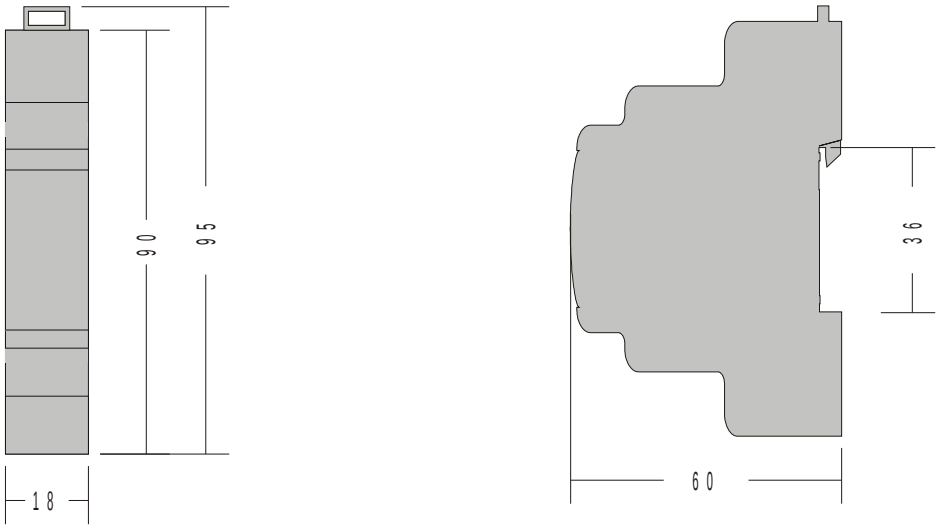
Table 2: internal bus		
K1	Data & DC power supply	Connection to other comm. module
K2	Data & DC power supply	Connection to controller or another comm. module

Table 3: marking and indication		
LED1*	RUN status	OFF: no power supply ON: power supply present UART communication to LPC-2.MC7 not active BLINK ON every 4s for 1s: power supply present UART communication to LPC-2.MC7 active
LED2	Rx	ON: - power supply present, - no ethernet packet received BLINK OFF: packet received OFF LED2 & LED3: no power supply present
LED3	Tx	ON: - power supply present, - no ethernet packet received BLINK OFF: packet send OFF LED2 & LED3: no power supply present

* available only on products, produced after maj 2007

3.2 Mounting instructions

Figure 3: Housing dimensions



- Dimensions in millimeters.

All connections, module attachments and assembling must be done while module is not connected to the main power supply.

Mounting instructions:

1. Switch OFF main power supply.
2. Mount LPC-2.NE1 module to the provided place inside an electrical panel (DIN EN50022-35 rail mounting) to the left side of the LPC-2 controller module.
3. Mount other LPC-2 modules (if required). Mount each module to the DIN rail first, then attach modules together through K1 and K2 connectors.
4. Connect devices and sensor wires according to the connection scheme in Figure 2.
5. Switch ON main power supply.
6. LED1 and LED2 should light on according to the Table 3.

Dismount in reverse order. For mounting/dismounting modules to/from DIN rail a free space of at least one module must be left on the DIN rail.

NOTE: LPC-2.MC7 main control module should be powered separately from other electrical appliance connected to LPC-2 system. Signal wires must be installed separately from power and high voltage wires in accordance with general industry electrical installation standard.

3.3 Module labeling

Figure 5: Labels

Label 1:

LPC-2.NE1
P/N: 225NE106001001
D/C: 40/08

Label 2:

S/N: NE1-S9-0800000003

Label 3:

MAC:
20-41-5A-1A-00-0C

Label 1 description:

1. **LPC-2.NE1** is the full product name.
2. P/N: 225NE106001001 is the part number.
   - 225 – general code for LPC-2 product family,
   - NE1 – short product name,
   - 06 – year of code opening
   - 001 – derivation code
   - 001 – version code (reserved for future HW and/or SW firmware upgrades).
3. D/C: 40/08 is the date code.
   - 40 – week of production
   - 08 – year of production

Label 2 description:

1. S/N:NE1-S9-0800000003 is the serial number.
   - NE1 – short product name,
   - S9 – user code (test procedure, e.g. Smarteh person xxx),
   - 08 – year (last two cyphers)
   - 00000003 – current stack number; previous module would have the stack number 00000002 and the next one 00000004.

Label 3 description:

1. 20-41-5A-1A-00-0C is a unique MAC dedicated to each NE1 module
   - 20-41-5A: 24-bit first portion is the OUI value assigned to Smarteh by the IEEE Registration Authority
   - 1A-00-0C: 24-bit second portion is the OUI value assigned by Smarteh

4 OPERATION

4.1 IP and MAC setting

Module uniquely assigned MAC is not saved in NE1 module memory. MAC belonging to each module is written on the label on the housing. Module gets its IP & MAC parameters from PLC application, therefore this values should be used in application running in the main control unit to which module is attached. This parameters are configured with following variables:

variable name	value
NE1_x_IP1	most significant byte of IPv4 address notation
NE1_x_IP2	:
NE1_x_IP3	:
NE1_x_IP4	least significant byte of IPv4 address notation
NE1_x_MAC1	first hex noted pair of OUI 48-bit MAC notation
NE1_x_MAC2	second hex noted pair of OUI 48-bit MAC notation
:	:
NE1_x_MAC6	last hex noted pair of OUI 48-bit MAC notation

4.2 Modbus protocol usage

LPC-2.NE1 Ethernet adapter is Modbus slave device and supports Modbus commands as defined in protocol specification V1.1a, using TCP/IP protocol, RTU transmission mode, ISO OSI model.

Device address supported by LPC-2.NE1 module:

- Coils (bit): 128
- Registers (word): 64

Functions supported by LPC-2.NE1 module:

- 01 (0x01) Read Coils
- 02 (0x02) Read Discrete Inputs
- 03 (0x03) Read Holding Registers
- 04 (0x04) Read Input Registers
- 05 (0x05) Write Single Coil
- 06 (0x06) Write Single Register
- 15 (0x0f) Write Multiple Coils
- 16 (0x10) Write Multiple Registers

NOTE: If Modbus parameters are not valid (illegal address,..), module replies with exception code response.

For better understanding of Modbus protocol refer to www.modbus-ida.org and *Modbus_Application_Protocol_V1_1a.pdf* document.

Memory layout:

LPC-2			**ETHERNET**		
LPC-2.NE1 variable	*direction*	*memory sector*	*modbus address*	*direction*	*Modbus functions*
NE1_x_bOUT001 NE1_x_bOUT002 : NE1_x_bOUT128	-->>	Discrete input [bit size]	1 2 : 128	-->>	0x02
NE1_x_bIN001 NE1_x_bIN002 : NE1_x_bIN128	<<--	Coil [bit size]	1 2 : 128	-->> <<--	0x05 0x0F 0x01
NE1_x_wOUT001 NE1_x_wOUT002 : NE1_x_wOUT064	-->>	Input register [16 bit size]	1 2 : 64	-->>	0x04
NE1_x_wIN001 NE1_x_wIN002 : NE1_x_wIN064	<<--	Holding register [16 bit size]	1 2 : 64	-->> <<--	0x06 0x01 0x03

5 TECHNICAL SPECIFICATIONS

Table 5: Technical specifications	
Power supply	from internal BUS
Power consumption	0.5 W
Connection type	RJ45 FM connector
suitable mating	RJ45 male, cable connector
Dimensions (L x W x H)	90 x 18 x 60 mm
Supported protocol	Modbus/TCP slave
Weight	50 g
Ambient temperature	0 to 50 °C
Ambient humidity	max. 95 %, no condensation
Maximum altitude	2000 m
Mounting position	vertical
Transport and storage temperature	-20 to 60 °C
Pollution degree	2
Protection class	IP 30

6 CHANGES

The following table describes all the changes to the document.

Date	V.	Description
1.7.2012	004	CGP General update.
11.5.2010	003	Updated warranty permanence.
23.3.2010	002	added Label 3 description
23.4.2007	001	The basic version, issued as *User Manual user manual*.

7 NOTES